

REMARKS/ARGUMENTS

The Official Action has been carefully considered and the Examiner's comments are duly noted. Reconsideration of this Application is respectfully solicited.

It is noted that claims 1 and 5-10 are now pending. It should also be noted that claims 2 and 3 were previously in this Application and were withdrawn.

It is respectfully requested that in view of the Amendment for claim 1 and the following argument and reason for allowability, claims 2 and 3 should be further considered in connection with claim 1 and reentered into this Application.

Claims 1, 5-8, and 10 were rejected under 35 U.S.C. 103(a) over Konuki [JP10282339] (of record, previously cited) in view of Noda et al. [US8642897] (of record, previously cited).

Firstly, it should be noted that claim 1 was amended to change "comprising" to "consisting of". With this Amendment, the difference between the present invention and Konuki '330 is believed to have been further clarified, since KONUKI '339 comprises an activation step, which the present invention does not include.

Clearly, the omission of the activation step is a distinct advantage over the basic prior art of Konuki '330 and no addition of Noda et al. regardless of how combined can result in the teachings of the present invention and the advantages obtained with the teachings of the present invention.

No new search is necessary because the Examiner is fully familiar with the prior art, and Applicant has provided the Patent Office with all the prior known to him and brought to his attention from the prosecution of this subject matter in other countries. The issue remaining is solely concerned with the "activation step" which according to the teachings of this Application is no longer necessary, and this is the advance over all of the prior art.

The Examiner also should again consider the arguments submitted in reply to the previous Official Action and, in certain areas, the previously submitted arguments will be repeated for the sake of completeness and to avoid having to refer to the specifically previously directed arguments. The earlier arguments together with the amendment of claim 1 plus the additional detailed distinctions now to be submitted should indicate clearly why Applicant considers this invention to be a clear advantage over the prior art and to be patentable.

Please give careful consideration to the following with respect to the earlier KONUKI '339; the Xe₂ (Xenon) excimer lamp light in KONUKI '339 was first irradiated to the surface of quartz glass plates for 15 minutes, before an alkoxide was coated onto the surface of the quartz glass plate, so as to activate the surface of the quartz glass plates.

In the previous Official Action, the Examiner pointed out and agreed that KONUKI '339 discloses most features of the present invention and the differences between the present invention and Konuki '399 are suggested by either one of Konuki '339 or Noda et al. Applicant, at that time, pointed out what steps he considered to be the clear differences.

As noted above, in KONUKI '339, Xe₂ " (Xenon) excimer lamp light was first irradiated to the surface of a quartz glass plate for 15 minutes, before the alkoxide was coated onto the surface of the quartz glass plate and another quartz glass plate was superposed onto the coated surface of the quartz glass plate. In KONUKI '339, this previous Xe₂ " (Xenon) excimer lamp light irradiation was essential to attain adhesion of the two quartz glass plates with an alkoxide.

On the contrary, the distinction between the present invention and the earlier KONUKI '339 disclosure is that a previous Xe₂ " (Xenon) excimer lamp light irradiation is not necessary in the present invention. Therefore, this is a clear patentable difference and a patentable distinction from the earlier prior art.

In contrast, the present invention was made by finding and appreciating that quartz glass plates can be directly adhered with an alkoxide by irradiating them with ultraviolet light having a wavelength shorter than 200nm, without the previous activation of the surface of the quartz glass plates, if applying a mechanical pressure so as to reduce uneven gaps between the quartz glass plates and using a nitrogen atmosphere or rare earth gas atmosphere in order to prevent ultraviolet absorption, and the adhered quartz glass plates transmit ultraviolet light having a wavelength down to 160nm (the adhesion was attained with Si-O bond, see the Examples).

As noted heretofore, claim 1 was amended to eliminate any inference that any of the claims include "an activation step". And, it should be noted, that claim 2 includes the limitation of the glass plates being laterally adhered. Therefore, claims 2 and 3 previously withdrawn should be reentered into the present Application and allowed together with claim 1.

The inventor found the present invention as a result of vigorous efforts, after he made the invention of KONUKI '339 (the same inventor's invention).

This finding is surprising and provides for significant patentable advantages over the earlier prior art.

Since the step of the activation of KONUKI '339 is now precluded and excluded from claim 1, the amended present invention is clearly not taught and is not obvious from KONUKI '339.

For the sake of order, it should be noted that when KONUKI '339 was originally disclosed, it was not possible to attain adhesion of two quartz glass plates with an alkoxide without a previous Xe₂ " (Xenon) excimer lamp light irradiation. The previous Xe₂ " (Xenon) excimer lamp light irradiation was considered to activate the surface of the quartz glass plate, by which an alkoxide coated thereon reacts with the activated surface of the quartz glass plate to allow adhesion of two quartz glass plates by additional

irradiation of Xe₂ " (Xenon) excimer lamp light irradiation to alkoxide. So far, as Applicant is aware, there is no prior art to contradict this statement.

Also, it was not known that a previous ultraviolet ray irradiation can be eliminated to attain the adhesion.

In the present invention, two features of applying a mechanical pressure to the two materials from both sides thereof and using a nitrogen or rare earth gas atmosphere are essential features and should be given full weight by the Examiner. Additionally, the interposition of a metal alkoxide between the two materials was not known and at least one of which further comprises a medium transparent to ultraviolet light, and by the combination of these three features with irradiation of ultraviolet light with a wavelength shorter than about 200nm to the alkoxide portion, adhesion of the two materials is attained.

In the present invention, adhesion of the two quartz plate materials is attained without a previous ultraviolet ray irradiation. Clearly, a feature taught only in the present disclosure.

As previously pointed out, the present invention was attained by a vigorous effort and careful work on the part of the present inventor for a plurality of years after the disclosure of his earlier KONUKI '339.

KONUKI '339 does mention the application of a mechanical pressure in paragraph (0021). Please note paragraph (0021) is Example 2, which concerns an improvement over Example 1. In Example 1, as previously noted, five polarizers of quartz glass are stacked. In Example 2 (paragraph (0021)), a mechanical pressure is applied to the edges of the stacked five polarizers in order to reduce gaps between the stacked polarizers. Therefore, the mechanical pressure applied to the polarizers in Example 2 is not during the adhesion of the polarizers with an alkoxide by irradiation of

ultraviolet rays. Another clear distinction which pertains to the present invention, and not the earlier teachings and disclosure.

In Example 3, it is stated that the mechanical means of Example 2 is difficult to reduce gaps between polarizers at central portions thereof, and in place of Example 2, reduction of gaps between the polarizers can be attained by using an alkoxide. In Example 3, an alkoxide is converted to a solid between the polarizers so as to reduce gaps between the polarizers.

Paragraph (0022) of KONUKI '339 clearly states that the mechanical pressure application as stated in paragraph (0021) is not sufficient. Another problem overcome with the present invention.

Please give consideration to the purpose of using an alkoxide between polarizers in Example 3 of KONUKI '339 is to reduce gaps between polarizers. The level of adhesion between the polarizers is not specifically mentioned and is not important in KONUKI '339, and contrast this with the teachings in the present invention, that strong adhesion between quartz glass materials is the purpose or object so that a wide quartz glass window can be provided. Applying a mechanical pressure to the two materials from both sides thereof and using a nitrogen or rare earth gas atmosphere are essential and important to attain the aforementioned purpose and object.

KONUKI '499 (JP 10-282499), previously cited, is at most equivalent to and adds nothing to KONUKI '399 in relation to the teaching of bonding two quartz glass sheets (also cited in Japanese search report). Mention of KONUKI '499 is made so that the argument will be complete in all respects.

The Examiner also referred to paragraphs (0018), (0055) and (0058) of KONUKI '499 (referred to in the previous official action) and alleged that they disclose applying a pressure to plates as in the present invention. With the amendment of claim 1, KONUKI '499 is completely removed and distinguished.

It is the Examiner's position that the present invention is obvious from KONUKI '339 in view of Noda et al. Applicant respectfully dissents for the reasons noted above. While Noda et al. will be considered from the point of view of a modification of KONUKI '339 to avoid any inference that the references have been argued individually. Specifically, as will be demonstrated, no possible modification of each of the references or possible combination of any parts of the individual references will result in the features of the present invention as now claimed and the advantages obtained.

Noda et al. was previously discussed, and should be considered from the point of view that Noda et al. discloses a method of bonding first and second substrates, providing a bonding layer between the substrates, pressing the substrates together and drying the bonding agent to bond the substrates together (page 4, lines 3-6 of the Office Action).

Noda et al. as previously pointed out relates to a classic-type bonding agent and does not disclose irradiation of ultraviolet rays to bond quartz plates.

Please note that the present inventor first found that using the two features of applying a mechanical pressure to two materials from both sides thereof and using a nitrogen or rare earth gas atmosphere are essential, in addition to interposing a metal alkoxide between two materials, at least one of which comprises a medium transparent to ultraviolet light, and by the combination of these three features with irradiation of ultraviolet light with a wavelength shorter than about 200nm to the alkoxide portion, adhesion of the two materials can be attained.

Therefore, even if Noda et al. were to teach application of a pressure between the two substrates in bonding which Noda et al. does not in the context of the disclosure of the present Application, this teaching of Noda et al., even if it is combined with KONUKI '339, cannot suggest and does not teach the present invention, which resides in finding of the completely new bonding method, not an improvement over a well-known prior art of binding with a classic-type bonding agent.

Therefore, Noda et al. does not disclose nor suggest the invention as now claimed nor the application of pressure in relation to the technical idea of the present invention. No combination of KONUKI '339 and Noda et al. suggests or teaches the present invention.

Noda et al. does not relate to bonding two transparent materials with an alkoxide interposed therebetween by irradiation of ultraviolet rays.

Therefore, no combination of KONUKI '339 and Noda et al. teach the feature of a nitrogen gas atmosphere as used in the present invention, in which two features without an activation step and of applying a mechanical pressure to two materials from both sides thereof and using a nitrogen or rare earth gas atmosphere are essential, in addition to interposing a metal alkoxide between two materials, at least one of which comprises a medium transparent to ultraviolet light, and by the combination of these three features with irradiation of ultraviolet light with a wavelength shorter than about 200nm to the alkoxide portion, adhesion of the two materials is attained.

Clearly, as pointed out heretofore, and with the amendment of claim 1, KONUKI '339 even in view of either one of KONUKI '499 or Noda et al. does not teach nor suggest the present invention.

It is important that, therefore, even if KONUKI '339 were combinable with Noda et al., the present invention with amended claim 1 is not obtained.

Noda et al. should only be considered solely for what it actually discloses and not for what the Examiner would like it to disclose. Specifically, Noda et al. discloses bonding of substrates with a water-based bonding agent by the so-called sol-gel process, which is essentially different from the irradiation of ultraviolet light to an alkoxide. The benefit of the teachings of this Application should not be read into Noda et al.

The reaction of sol-gel process of Noda et al. and the reaction of an alkoxide by ultraviolet light having a wavelength shorter than 200nm in the present invention are essentially different from each other.

Therefore, the teaching of Noda et al. does not teach nor suggest the present invention.

Noda et al. does not disclose any necessity of a nitrogen atmosphere or rare earth gas atmosphere in order to prevent ultraviolet absorption in the reaction of an alkoxide by irradiation of ultraviolet light having a wavelength shorter than 200nm.

Therefore, there is no motivation to combine KONUKI '339 with Noda et al., since the sol-gel process is different from method of irradiating ultraviolet light to an alkoxide.

Thus, the present invention is not obvious from any combination of KONUKI '339 in view of Noda et al., regardless of how one would select the teachings to combine them

The Examiner has also taken a view that the present invention is obvious from Nakamura in view of Noda and Hirayama et al.

For the sake of the record, Nakamura relates to a method which comprises applying a primer composition on an optical part, placing an epoxy resin adhesive composition or a silicon resin adhesive composition and then curing the resin adhesive composition (claim 1 and 7).

It should be noted that a silane compound is included in the primer composition, which is different from an alkoxide of the present composition.

Furthermore, in Nakamura, since the epoxy or silicon resin adhesive composition is used as the main adhesive, an adhesive layer formed between optical parts does not transmit ultraviolet light having a wavelength of 200nm or shorter therethrough.

The reaction of Nakamura is essentially different from the reaction of the present invention.

The important feature of the present invention is to provide adhered quartz plates which allows ultraviolet light having a wavelength of 200nm or shorter transmit through the adhered quartz plates, which is attained by an adhesion comprising an Si-O bond in the present invention and without any requirement for an activation step.

Nakamura uses a normal-temperature curable, thermally curable and photo curable adhesive composition (see paragraphs (0036) and (0058)), which does not provide an adhesion which allows ultraviolet light having a wavelength of 200nm or shorter transmit therethrough.

Thus, the disclosure of Nakamura is essentially different from the present invention.

Therefore, even if Nakamura is combined with Noda and Hirayama et al., the present invention is not obtained.

The present invention is not obvious from Nakamura in view of Noda and Hirayama et al.

It should be further noted, and as previously pointed out, that two features of applying mechanical pressure to the two materials from both sides thereof and using a nitrogen or rare earth gas atmosphere are combined with the interposition of an alkoxide between two materials, at least one of which comprises a medium transparent to ultraviolet light, and irradiation of ultraviolet light with a wavelength shorter than about 200nm to the alkoxide portion, without a previous ultraviolet irradiation to the surface of the two materials, by which adhesion of two materials is attained, as a whole, is not easily derivable from KONUKI '339 in view of Noda et al.

It should be noted for the sake of the record, that the present invention was not the work of simplicity, but a careful study of the technologies and the unique requirements of this art. Specifically, the same inventor of KONUKI '339 required a number of years to reach and perfect the present invention from the knowledge that one could derive from KONUKI '339 and Noda et al.

If any fees are necessary, please charge to our Deposit Account No. 10-0100. Please obtain all necessary extensions to keep this Application alive, and charge to our Deposit Account No. 10-0100.

It is respectfully submitted that an earnest attempt has been made to place this Application into condition for allowance.

Further, all of the points raised by the Examiner are believed to have been answered.

If there are any points outstanding, the Examiner is respectfully asked to call Applicant's attorney in order to do what is necessary to place this Application into condition for allowance.

It is also requested that with the allowance of claim 1, that previously withdrawn claims be reentered and allowed with claim 1.

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CUSTOMER NO. 28752

Early and favorable reconsideration is respectfully solicited, together with the allowance of this Application.

Respectfully submitted,

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